Art. XVI.—*Delayed Dehiscence in Myrtaceae, Proteaceae and Coniferae.*

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(With Plate XI.)

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The following notes are for the recording of the occurrence of delayed dehiscence in several genera each of the families Myrtaceae, Proteaceae and Coniferae. The cause of the phenomenon is for later consideration.

MYRTACEAE (*Eucalyptus, Callistemon, Melaleuca, Tristania*).

In the capsular section of the Myrtaceae (Leptospermeae) fruits often persist with unopened valves long after reaching maturity. In several species of *Callistemon* and *Melaleuca* this is habitual, in *Eucalyptus* it is occasional, and in *Tristania* it is infrequent.

Eucalyptus platypus, var. *acutifolius*, grown near Melbourne, bloomed in its fourth year. By the time the fruit had reached full size the fructiferous twigs were 1/10 inch in thickness and the umbel peduncles one inch long, but by annular increase the former encroached until the peduncles were immersed and the umbels then appeared as if normally sessile on the thick branches into which the twigs had meanwhile developed. The persistent fruits were little if anything larger than those of later production, and seed from 5-year-old capsules germinated. Other species of *Eucalyptus* occasionally retaining seed are *E. obliqua, E. macrorrhyncha, E. capitellata, E. australiana, E. dives, E. viminalis, E. rubida, E. haemastoma, E. elaeophora, E. botryoides*, and *E. cladocalyx*. Immersion occurs in several of these.

Callistemon[1] and *Melaleuca* keep their fruits for long periods with seeds germinable up to at least the 6th year, after which fertility is doubtful, not so much on account of age as owing to the attacks of micro-fungi and minute insects. The fruits of *Melaleuca nodosa* do not become scattered on enlarged branches as do the old fruits of most species of *Callistemon* and *Melaleuca*, but remain crowded round the thin branches, and become hexagonal and pseudo-connate by compression. This compactness of the fruit mass secures immunity from dislodgment of individual fruits by external agencies.

Other species noted, as affected in varying degrees, are *Callistemon lanceolatus, C. coccineus, C. rugulosus, Melaleuca Priessiana, M. styphelioides, M. hypericifolia*, and *Leptospermum scoparium*.

1.—See Ewart, A. J., The Delayed Dehiscence of Callistemon, *Ann. Bot.*, xxi., p. 135, 1907.

PROTEACEAE (*Hakea, Banksia*).

On one tree of *Hakea laurina* fruits of recent years have opened but those of the first five years have remained closed. *H. saligna, H. rostrata, H. nodosa, H. ceratophylla, H. leucoptera* and *H. ulicina* to some extent behave similarly. In a 20-year-old hedge of *H. leucoptera*, observed a few years ago, unopened fruits still clung to the stems near the ground and to a height of about 10 feet, with stalks immersed and the basal parts of the fruits fused with the stem.

In *Banksia*, a genus in which many species fail to produce fruit from the greater number of flowers, two species—*B. integrifolia* and *B. marginata*—have been found to linger occasionally but for shorter periods.

In *Protea mellifera* and *Isopogon ceratophyllus* the normally indehiscent fruits are frequently retained in the heads for many years; and this, as affecting seed dispersal, somewhat resembles delayed dehiscence.

CONIFERAE (*Pinus, Cupressus, Callitris*).

Pinus.—While most pines are reputed to discharge their seeds when the cones are one, two or three years old, many holding the cones long after releasing the seed, a few species are known to retain unopened cones for many years. Among others, the Monterey Pine preserves this habit in Victoria. I have seen an example of *P. radiata* (syn. *P. insignis*) which shows an unopened 8-year-old cone on a 7-inch diameter stem.

Cupressus keeps the opened cones attached for many years, but does not habitually reserve the seed. *C. macrocarpa* may carry closed 7-year-old cones on branches of more than an inch in thickness. Seeds of 5-year-old fruit germinated. An old tree of *C. torulosa* delayed during five years.

Callitris (Cypress Pines) frequently reserves its seed. In *C. glauca, C. verrucosa, C. propinqua, C. calcarata* and *C. tasmanica* I have only occasionally noticed it, but several young trees of *C. Muelleri* have been under observation during many years. The unopened cones persisted through six seasons. Two years ago a bush fire scorched away one side of three trees, exposing the otherwise concealed fruits to sudden and great heat, and later to the attacks of direct sun-rays and hot winds without producing dehiscence.

In all cases, except the stubborn Callistemons and Melaleucas and also *Callitris Muelleri*, fruits of long persistence responded to desiccation, releasing their seeds within a week or two after their removal from the tree. Many cones of *C. Muelleri* taken after four years and kept in a dry place during three years are still closed.

EXPLANATION OF PLATE.

Eucalyptus platypus, var. *acutifolius*, showing fruits of various ages, the oldest with peduncle immersed.